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A batch-mode, computer-based, serials system was developed for the bio-medical library, a departmental library at the University of Minnesota. Patterned after the "arrival card" system now in use in several libraries, it is designed so that serial check-in is done by marking off the issue on a printed list of serial issues expected during the month, based upon predictions made by the computer. Any gifts or unexpected issues or supplements (about 207 of the total) which do not appear on the check-in list are handled by use of a serial check-in form. This information is added to the master file and at the end of the month corrections to the prediction codes, if necessary, are made. Other monthly printouts are: (1) a serials master list which contains all the information collected about each serial title (7800 in all), (2) a patron holdings list, a list to be used by patrons containing less information than the previous list, and (3) bindery list of items for which volumes are completed. The first two lists are supplemented by daily cumulative supplements prepared from the daily input cards made when a serial issue arrives. A cost analysis made in connection with the project shows that the average cost per transaction is $0.71 in the new system. (CM)

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UNIVERSITY OF MINNESOTA
BIO-MEDICAL LIBRARY SERIALS CONTROL SYSTEM

Comprehensive Report

Fall 1966-June 1968

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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UNIVERSITY OF MINNESOTA

BIO-MEDICAL LIBRARY SERIALS CONTROL SYSTEM

Comprehensive Report of Activities

Fall 1966 - June 1968

Done under PHS-LM-00171

Submitted by

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June 3, 1968
University of Minnesota
Minneapolis, Minnesota

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UNIVERSITY OF MINNESOTA
BIO-MEDICAL LIBRARY SERIALS CONTROL SYSTEM

1. INTRODUCTION

In the Fall of 1966 system specifications for a MEDLARS compatible serials control system were devised. Implementation of the system was funded under the Medical Library Resources Act administered through the National Library of Medicine. In February 1967 we began data conversion and development of the software and clerical procedures vital to the system. The project staff consisted of the following personnel and their responsibilities:

Project Director (100%)	- Administrative decisions regarding the progress of the project, systems design improvements and programming requirements for the system.
Programmer/Analyst (100%)	- Program specifications, system design improvements, software development, debugging and programmer, operator documentation.
Library Assistant (100%)	- Data conversion auditing, preprocessing during Master-file building, data checking, problem solving resulting from data conversion, running the installed system.
Key Punch Operator (100%)	- Keypunching of data and programs, and assorted clerical tasks as required.
Data Collection Personnel	- Library Assistants and senior clerks with one junior librarian on a part-time basis responsible for encoding manual serials file data prior to keypunching.

This work was spread over 14 months. Data collection took 1½ full time equivalent personnel eleven months to convert a file of almost 8,000 entries composed of records then stored in four physical locations.

2. SYSTEM SCOPE

2 A. OBJECTIVES

The present system is a batch mode serials system patterned after the "arrival card" form of the present state-of-the-art systems. It is designed to fulfill the following system objectives:

1. Better control of check-in operations.
2. Improve library user services by the provision of monthly, with daily accumulated arrival supplements, holdings lists formatted for easy user understanding.
3. Centralization of serials record activity into a small group within the library.
4. Relieve congestion and telephone traffic in a crowded circulation and reference desk area.
5. Provide bindery operation processing and control.
6. Provide yearly cost/expiration data for preliminary notification of central library ordering department for renewals and give estimated subscription costs.
7. Give a broad subject access to the serials collection to produce subject listings of journal titles.
8. Provide want-lists of missing items.
9. Provide Index Medicus/MEDLARS TAPE match compatibility for comparison of holdings information against retrieval citations.
10. Provide output for automated journal circulation control system when this phase of library systems is converted to an EDP based system.
11. Provide management with statistical data on subject, language distribution of the collection, additions to, transfers out and deletions from the collection, and an audit trail of record changes into the system.
12. Serve as a pilot project for a total library-wide serials control system and in the interim serve as basic file input for the third generation on-line mode Bio-Medical Library system utilizing cathode-ray-tube display consoles for I/O operations.

Such system objectives are worth their cost and development effort because of the interrelationship of four broad planning areas at the University. These areas are:

1. University Libraries' information systems plans,
2. University Medical School's planned expansion and decentralization,
3. present regional medical information program for Minnesota,
4. National Library of Medicine programs.

2 B. INPUT

Basic input to the file may be seen in Figure 1. which is the Master file tape layout. The file is composed of two record types--serial and cross reference. A serial record contains fixed and variable field data for either currently received serials or non-current serials. A cross reference record may contain any information message that we wish to appear in our listed outputs. Card one of a record contains the fixed field record data and cards 2-9, A-Z, contain variable field data according to the following order:

Variable field 1. Index Medicus Abbreviated Title.
" " 2. Full cataloged title. (L.C. format).
" " 3. Place of Publication.
" " 4. Holdings Statement.
" " 5. Note Statement.
" " 6. Call No.
" " 7. Analytic tracings in the card catalog for the serial.
" " 8. Bindery title (if different than cataloged titl

Each field is delineated by use of a $ sign as a field mark. The total record length is variable and its limits are set only by the tape blocking factor. In one input pass, records having up to 2,625 variable field characters may be entered into the system, upon additional passes like amounts may be entered. Typical record length for our serial records is between 400-500 characters and 100-150 characters for a cross reference record. 7,500 records are contained in the Master file of 2,1 million characters.

This flexibility of a total vaniable length record was felt necessary since some serials have extremely long holdings statements or bibliographic notes. Our definition of a serial is broad, everything from conference proceedings to certain government reports are entered into the system along with journals, annuals, and various indexing service publications. This adds to the record complexity and necessitates a flexible system able to accommodate various categories of publications of a serial nature.

The appendix to this report contains samples of the forms used in the system--output samples, an index to the system programs and certain analytical information.

3. SYSTEM CONVERSION AND INSTALLATION

Throughout the planning for this system it seemed apparent that our major obstacle would be the conversion of existing data files to a machine readable base. Because of file size and keypunch availability it was felt that keypunch input would be used rather than other means. From our experiences with this file conversion mode it may be more economical to use equipment such as the Control Data 915 page reader to scan typed input in the OCR font. This would depend upon the amount of input necessary to build a Master file, rate per hour for the equipment, and availability of OCR font electric typewriters. Such input preparation would seem to be more economic of coders time and have lower material costs. However, the equipment cost would be higher than current card punch costs. This designer would definitely investigate the input mode carefully before any larger scale data base conversion would be done in our University Library systems planning.

The original record information was geographically scattered between the Bio-Medical Library in Diehl Hall and the central library, half-way across the campus. This meant that records would have to be built by organizing the data into blocks of information so that coders could be assigned specific tasks to accomplish on a batch of newly transcribed records. Consequently, much organization was involved to coordinate the different batches of input being prepared by various coders. Since our coders had at least a library school background, training them became less of a problem than if we used purely non-library oriented clerical help. Staff training became mostly familiarization with the code forms, codes, rules for holdings statement transcription, and general cataloging practices followed in the Bio-Medical Library. Record conversion organization was split up into 7 major tasks, each task normally performed by separate coders. These tasks were:

1. Determination of serial title entry.
2. Receipt code assignment for currently received journals.
3. Subscription information.
4. Bindery coding information.
5. Location-circulation information.
6. Visual record checking - input no. assignment.
7. Keypunching of record.

Determination of the serial title entry was the initial step to start conversion of a given record. Coders worked in this stage with the serial check-in file drawers, the corresponding card catalog drawers, and verification tools as necessary. Since the titles in the check-in file did not always agree in format with the official catalog, the Bio-Medical Library decided to clean up its records to agree with catalog practices. Therefore, titles were combined into one record under their latest titles, with suitable bibliographic notes included in the records, and cross references made.

A recent policy change to follow new L.C. policy has been in use since November 1967 so that title changes as of that date have been handled by beginning of a new record under the new title and placing a suitable note of continuation on the old title record. Therefore, there is now a measure of consistency which previously did not exist, and furthermore, shelving and records now agree, making it easier for the library user to locate serials. When the proper full cataloged title entry had been determined, the coders then transcribed the Index Medicus Abbreviation from the List of Journals Indexed in Index Medicus or created abbreviations according to an unpublished list of NLM abbreviations procured especially for this project. Next, place of publication was ascertained and holdings statement information transcribed. Bibliographic notes, separate cross reference records if needed, call no. if shelved in the book stacks, or other special locations noted, and analytic tracings were next added to the record. Clearly, it can be seen that this step amounted to a recataloging of each record, and the solution of these bibliographic problems required some library/ cataloging knowledge.

Receipt code assignment, pertaining to serials to be incorporated into the automated check-in arrivals portion of the system, (approximately 2500 journals) was handled by the full time Library Assistant or the Project Director who had devised the coding scheme. Because we wished to predict the arrival of journal issues, by depicting series no. where applicable, vol. no., issue no., combined issue no's., part no. and month, day, year date of the issue since this latest date would always show in our output information for staff and patron use, a somewhat complex code system was developed. This system, far more elaborate than utilized in many other systems of this type was felt necessary to accurately reflect this predictive problem. In the section later devoted to System Differences we will discuss this further.

Subscription information consisting of receipt category, vendor, invoice date, amount paid, and expiration data had to be transcribed from separate records in the central library. This involved teaching our personnel performing this function the notations used in this file. To minimize travel time batches of input were organized so that a long period of time could be spent working with these files.

Bindery coding information also involved use of a remote file record which was in the midst of being converted to a standardized bindery instruction format. At certain points it was found to be faster and more accurate to use the set on the shelf itself rather than the bindery record to give necessary information. This was particularly true of the information regarding the location of the Title Page, Index, and Table of Contents, necessary in our system to, in part, determine volume completeness.

Location-circulation period information was handled as a separate file building task upon completion of the initial record conversion since shelves were being shifted and circulation policies for journals being revised.

Completed records on input code sheets were then visually checked for inconsistencies or errors and a deck number assigned to each sheet. This number serves as the record number through the input audit and file update control where the computer automatically calculates a record ID Code No. for that record for alphabetizing purposes. By this Deck No. we can spot any missing or incomplete input in a processing batch and this forms one tally in our audit trail of input to the system. Computer calculated alpha-numerical ID Code numbers during the initial file building maximized the overall code distribution, giving more growth potential than skipping a set block of digits uniformly throughout the file.

After the records are keypunched and visually checked for deck no., order, etc., by the Library Assistant they become input to the Input Audit Program which checks for legal characters in the fixed field portions of the record and proper entry of the variable fields, particularly the hierarchical scheme used for holdings information. Records passing this audit are written onto the input tape ready to be used as input to create the new Master file tape. Records rejected on the Input Audit ERROR Listing must be corrected and re-audited until they are accepted as clean input for use by the system.

One of the primary problems of building the initial file was one of timing the software development to fit our data conversion task. In this aspect we were fortunate to have each program debugged and functioning when we needed it. This resulted because of realistic scheduling, maximum computer turnaround, and last but not least extremely capable programming talent. Since our personnel hiring for file conversion did not coincide with receipt of funds for system development we had to perform our system installation in two steps, first building a basic converted Master file and secondly retirement of each currently received record to enable us to begin automated check-in features of the system. This record phase also enabled us to correct some small record inconsistencies, correct original errors discovered through use, and double check our records against the manual serials check-in file. An alternative method, whereby the records are entered in batches, each batch retiring a section of the manual file, could have been used if our hiring would have been timed differently. However, after some consideration, we feel this two-step approach has really been better in terms of less confusion for our staff, especially during the dual system operation, since both files in total were being handled under mechanized and manual systems.

The most important installation factor is the timing necessary to begin predicting the arriving issues as of a certain month. This was triggered by creating an adjustment card which sets the volume and issue numbers properly in phase with the assigned predictive code. Invariably mistakes have been made in creating this adjustment which are discovered in using the check-in list to process our daily arrivals. To add to this problem, some operations at this point took longer than anticipated so that when we began producing the check-in list we had a list which reflected August, September, October expected arrivals, many of which had already been entered into the system Master file by hand coding an arrival card. This necessitated a clean-up campaign to debug this listing so that it reflected only expected arrivals not received and items claimed. Our November, December expected arrivals cleared up the list so that we began actually using a clean list for the check-in procedure for the January 1968 expected arrivals and any late published items held on the list from August through December 1967. Actual use of this list will be explained under System Operation.

4. SYSTEM OPERATION

4 A. ARRIVAL PROCESSING

The Bio-Medical Library Serials System is composed of clerical functions aided by a computer based record processing system. Serials collection record maintenance must provide for the following record tasks:

1. Daily arrival check-in, new titles, changes, etc.
2. Bindery shipment processing - return bindery processing.
3. Claim processing.
4. Want list processing.
5. Renewal subscriptions - order processing.

Except for the last task all these are currently processed under the computer based system. Since this library does not process its own acquisitions or maintain its own accounting, the system was designed to permit this task to be implemented at a later date as needed. The function of these clerical procedures is the maintenance of records reflecting the physical characteristics of our serials collection, enabling easy reference and patron use, and efficient, accurate processing operations to support these functions.

Figure 2. shows the Bio-Medical Library Journal Check-In Procedure. This operation is accomplished by use of the Bio-Medical Serials Check-In List (sample in the Appendix), together with the Serials Master file list for processing items not on the automated check-in list. The clerk merely takes the stack of journals to be processed, alphabetizes them and checks each issue against the check-in list. If the volume no., issue no., and date agree an "R" is written in the Disposition Column. If there is a discrepancy of date, vol., or issue no., the clerk may adjust the error by making an "A" in the Adjust Column and correcting the error on the list. This is basically how the check-in clerk uses this listing to aid her. For items not predicted on the list, the clerk fills out a Serial Arrival Form taking the journal code no. from the Master File Listing. Toward the end of the day the marked items on the check-in list and the items on the Arrival Form are keypunched and become the input for that evening's computer run.

The arrival prediction is run on a monthly basis; however, at any time during the month errors may be removed from the list by deletion or adjustment since a daily computer run is used to process the arrivals. This daily run, as we term it, removes the received items from the check-in list, generates a clean check-in list, now somewhat shorter, with the Adjusted items now corrected, and at the same time prints the Cumulated Daily Supplement for insertion in the Master Lists and patron title listings. Near the end of the month, the remaining items on the check-in list represent potential claims which are reviewed by the serials librarian. Those claimed are marked "W" in the Disposition Column; any to be deleted are marked "X" in the Disposition Column. At this time all items having an adjustment made are reviewed, together with their predictive code assignment, this code is corrected if necessary, and the list keypunched. This becomes the last Daily run input for the month and will update the Master File which then is used to create the next month's various listings, including the new check-in list.

Keypunching of this information is rapid since only the code no., copy no., disposition and sequence no. are punched from the listing, under program control. The Serials Arrival Form is also quite easy to punch as only one card per issue is needed.

4.B. BINDERY PROCESSING

Processing of bindery shipments utilizes a Bindery Ready List which the system produces once a month. This list is very similar to the check-in list previously described and contains the volumes for each title which the system recognizes as complete for binding, i.e., proper number of issues per volume, index, title page, table of contents present, and the first issue of the next volume received. In this manner we do not process the latest issue during its highest usage time. By writing the proper codes on this list and keypunching cards similar to the check-in cards, we trigger the printing of the actual bindery instruction slip. Use of this method permits human evaluation of the completeness of the volume and the handling of binding volumes in multiple parts, etc., without wasting two ply NCR custom Bindery Instruction Forms.

To prevent binding volumes without their supplements (if these have been checked in) we work in combination with the total holdings record at the time a volume is checked for completeness which enables us to make a second pass and scan for supplements in the holdings record which form part of the volume. Since such supplements are sporadic in their publication we cannot code for them and check for them in the same fashion as we do the number of issues per volume which is somewhat more stable.

Volumes coded sent to the bindery are listed on the Daily Cumulative Supplement with the date sent and lot number. When these volumes are returned this is shown on the Supplement also. This obviates the need to prepare bindery charge slips, file them, then pull them, and destroy most of them, since most current journals circulate only overnight or not at all.

From the foregoing the relationship of bindery processing operations to the whole serials system can be easily understood. Consolidation of files, clerical operations, and the need to only check the Daily Cumulative Supplement for items processed as received, claimed, purchased for replacement, and sent or returned from the bindery speeds service to the library user, simplifies reference and circulation desk work, and creates a self-help environment for the user of the library wishing to help himself.

4 C. PROCESSING CYCLES

From Figure 3. BMLS Monthly Cycle the monthly processing man/machine operations show the path data takes through the system to reach the serials information user. Code forms with corrections, new records, etc. are keypunched and become input to the INPAUD block on the chart. This program checks legality of the data, number of fields, etc. and prints AEL-1, the Input Audit Listing. Everything not on this list has been accepted for processing and written on the disk file allocated for this input. After correcting errors, this rejected data is again passed and any other errors are listed along with a duplicate title input list. These errors are corrected and reentered. The Master File is updated and the monthly check-in list is predicted. Any errors sensed during this operation are printed and if critical, corrected before LSTGEN generates the monthly listed output, otherwise these corrections are processed the following month.

The problem of time lag between record processing to output for the next monthly processing run has been solved by utilizing the computer on a daily basis to do daily input processing in the check-in phases of serials file work. In this way we may issue a cumulative supplement of newly processed items. At the same time we are able to adjust errors on the check-in list and shorten it by removing the received items, making it easier for the clerk to use. Figure 4. shows the block diagram of this daily cycle. This flexibility permits us to schedule or not schedule daily runs as the workload, holidays, or staff work allocations may change independent of the computer operations.

5. SYSTEM REVISIONS AND OUTPUT ADDITIONS

This batch mode system will continue to be refined to fit the needs of this library. As we have proceeded at this time with a minimum of delay and without any serious problems we will now add certain refinements to the system not originally planned.

Firstly, will be the incorporation of call no. information for each of our records. This may be accomplished without any software changes since our records already do contain this information in the sixth variable field previously set aside for this purpose. By this step we will generate call no. listings upon demand to take the place of the serials shelf list file, obviating the need to file and revise these card drawers.

Secondly, we are planning to generate a want listing for our total holdings by having the computer translate our holdings gaps into the proper volume numbers. Admittedly, this will not generate a perfectly clean want list because of the changes in number of issues published in volumes for a given title through the years, occurrance of random supplements, extra issues, etc., but would serve as an editing source to derive a clean list.

Thirdly, to periodically clean up our cross reference records we plan to sort the cross reference records on the portion following the "see" getting a list of cross referencesarranged for each journal to which a cross reference refers and match these to records on the Master file. All those not securing matches would represent titles no longer on the file or an error condition to be corrected. These may then be handled as errors or deletions and processed on the Monthly Cycle.

This was felt to be more desirable than having the computer automatically produce cross references for each title change since some minor changes do not necessitate a cross reference. To control the output of a desired cross reference would mean a flag on the record if a cross reference was desired. From the human viewpoint, we decided the management of cross reference entries was better left to the librarian's direction rather than the system software. Such a decision, however, does not necessarily mean that in any given serials system this is the only desirable way to handle this problem, since objectives and size of these systems vary considerably among libraries.

6. BASIC SYSTEM DIFFERENCES FROM OTHER BATCH MODE SERIALS SYSTEMS

1. Through the use of Index Medicus abbreviations for periodicals, the system is compatible for search and comparison of holdings against MEDLARS TAPES without need to additionally create and store an abbreviation dictionary. This in turn would necessitate a prepass of our Master tape against the dictionary to derive the proper abbreviation for comparison to the one

on the MEDLARS citation output file.

2. Daily check-in punched card pulling and handling have been done away with by use of a check-in list. This also solves the problem of abbreviated titles, since the list uses 80 characters of the full cataloged title. The daily input is then punched from the list, only the code no., copy no., a one character action code, and sequence no. are punched under program control. 100 cards may be punched in 20-30 minutes with this kind of numeric input.

3. Holdings information for each entry in the file is complete, showing series no., bound or unbound volume no., issue no., part no., bound or unbound supplement numbers. Beginning and latest held date are also shown. Latest date is month, day, year as it applies to each journal. This statement of holdings is hierarchical and the character strings are searched and manipulated in the various routines for correcting and updating this portion of the record. The statement abbreviations are expanded for library user listing purposes.

4. Any length or form of information statement may be written to aid in use of the record for patron or staff purposes.

5. Prediction of the expected journal arrivals on the journal check-in list is handled by a sophisticated code arrangement permitting myriad combinations of issue numbers, months, weeklies of almost any pattern to be predicted with correct month, day and year dates based upon the previous year's publishing history. Journals not publishing numbers in sequence or weeklies not published really weekly, i.e. 6-7 per month in any random appearance are the only cases where predictive coding will not correctly handle the proper input information to check the item in using the check-in list. In this

case we merely list the remainder of the information and the clerk fills in the blanks. 80% of arrivals are processed using the check-in list. Of the remaining 20%, about three quarters represent gifts of past issues and the rest supplements of an irregular nature or totally unexpected items.

6. Record length maximum is controlled by the master-tape blocking factor and currently is 31,000 characters. Over 2,600 characters may be handled on each record in one input operation. Several of our records have holdings statements from 4,000-7,000 characters necessitating record length flexibility although the average total record length is about 480 characters.

7. System outputs and inputs are designed for ease in human use rather than mere ease of handling by the programmer or computer system. System software is sophisticated to handle as much natural language information as possible. This makes proofreading and human file interaction more simple. Slightly more machine time may be used in processing since our printed outputs are longer than if we severely abbreviated them, but human use of the outputs is our first consideration.

8. Serial system input has been made as flexible as possible to permit inclusion of government documents, conferences, annuals, report series, and any other types of items the library considers serials from a shelving or processing viewpoint.

7. SYSTEM COSTS STUDY BY CHARLENE K. MASON

7 A. STUDY PLAN

A. Suggested items to analyze for costs of encoding Bio-Medical Serials information.

Direct Labor Costs

1. Basic coding (columns 1, 9-17, 20-25, 32-37, 71-72, 76, variable fields 1-7).
2. Bindery information on shelves.
3. Bindery information in bindery preparation.
4. Acquisitions information.
5. Receipt codes.
6. Checking.
7. Keypunching.
8. Other.

Direct Equipment Costs

1. Coding sheets.
2. Keypunch rental.
3. Cards (90,-100,000) = 2,000 box = 50 boxes @ 3/- = $150.00.
4. Reference tools
   Index Medicus list of periodicals
   National Library of Medicine list of word abbreviations (only if procured especially for project)
   ASA standard periodical abbreviations.

Indirect expenses

1. Systems analyst.
2. Research fellow.
3. Work-Study secretary.

B. Suggested items to analyze for costs of programming Bio-Medical Serials.

Direct Labor Costs

1. Programmer.
2. Operating personnel, if any.
3. Keypunch personnel.

Direct Equipment Costs

1. Computer time (other peripheral equipment).
2. Keypunch, if not the same as in part A.
3. Cards, printout supplies, etc.
4. Tapes.

Indirect Expenses

1. Library liason time--and/or systems analyst.

See Appendix 11 F. for cost study plans and data gathering forms used in this study.

7 B. STUDY REPORT

1. Background

During the process of converting the serial records to machine readable form and writing and debugging the programs needed, a cost analysis was done. This analysis was intended to cover all costs incurred from the conception of the project in June, 1966 to the present and to estimate continuing costs which will be incurred by the Bio-Medical Library.

After an introduction to the proposed system and the coding procedures for the serials records, the original proposal for analyzing the costs was drawn up in October, 1966, before any of the persons who would be coding the serials record information were hired. Purposes of the cost analysis were planned to be: (1) to show both absorbed and unabsorbed (directly incurred by the project) costs and (2) to try to provide some information which could be used as a guide in further cost analysis projects, particularly within the University of Minnesota Library.

Items which were to be included as part of the analysis were the following:

Part A--Conversion of serial records to punched cards.

- Direct equipment costs.
- Direct labor costs, including professional and clerical.
- Indirect expenses.

Part B--Programming, loading files, debugging.

- Direct labor costs, including programmer and correction of incorrect records.
- Direct equipment costs.
- Indirect costs.

Later this list was modified to make data collection somewhat easier. The professional section of direct labor costs for coding the serials information was broken down into its component parts; library liason time was considered an indirect cost and part of the analyst's time; and a decision was made to only estimate building and upkeep expenses since it is very difficult to obtain this information within the University.

Two types of forms were then devised upon which persons who would be coding the serials record information or doing other activities connected with gathering and converting the information into machine readable form could put data about the length of time each operation took. These were tested in a pilot project during December, 1966 and in January, 1967, in response to a request by the library administration, a preliminary analysis on the cost of the project was made. Since then modifications in the design of the project and a re-evaluation of the costs to be considered make the cost of the project appear larger than the estimate made.

During the spring of 1967 data was gathered on the form from persons involved in coding the serials information as well as from persons involved in keypunching, checking, and other aspects of readying the information for use by the computer. Later as the project drew to a close, more figures were obtained on the costs of supplies, personnel, computer time, and continuing costs.

II. Costs data and explanations

A. Costs of encoding the serials information--Labor.

1. a. Basic coding

This includes coding the status; copy number; language of serial; broad subject area covered by serial; location and routing information; number of volumes, issues, and supplements which arrive per year; latest volume and issue which has arrived; title page, index, table of contents information; retention code, and all bibliographic information contained in the variable fields. All of this work was done by graduate students who were hired by the Bio-Medical Library to work especially on this project. The original coding was done March through November, 1967 with these students totaling 60 hours per week at an average rate of $2.60 per hour, March through June, and $2.92 per hour after June 30.

About one-fourth of the time of these coders was spent in retiring the old file. Other activities of these persons included gathering data from the journals on the shelves and miscellaneous activities necessary to put the information coded in correct format, such as straightening out the old serial files and correcting mistakes found in it.

b. Bindery information in bindery preparation

Coding of information from bindery preparation record and from items on the shelves which were to be bound was done by a senior clerk as part of his regular duties during the period when the original coding was being done. Average rate during this time was $1.75 per hour.

c. Bindery information from the shelves

(See b. above also). One of the problems incurred at this point was the fact that pulling the items needed took much longer than the coding did. On the average it took four minutes to do any item which had to be pulled from the shelves, while an item which did not need to be pulled took only one to two minutes.

d. Acquisitions Information

This information was gathered in batches from the records held in Walter Library by several persons connected with the project. An average hourly rate of $3.00 has been used to estimate the cost of this part of the project, as personnel varied from time to time. A batch of four hundred active titles could be done in an eight-hour day.

e. Frequency coding of receipt coding

This was done only for the active titles, and generally, because a very exacting indirect code was set up for this, was done by a more experienced person. An hourly rate of $4.00 has been used to estimate costs for this function.

The above information is fully tabulated in Table 1. Of the 7,500 titles 21% (or about 1500) were cross references. The rest were complete entries of which approximately 2500 were active titles and 3500 were inactive titles. Time spent on cross references was figured as part of the time spent on the title with which they were connected. As can be seen from the table, the total cost for the above activities came to approximately $4,700.

2. Checking; assigning deck number

Checking of all entries was done before they were keypunched. While the person who did this also participated in data collection, his main responsibility was to this phase of the operation and to overseeing some of the administrative details of the project. He spent half of his time working on the project September, 1966 to February, 1967 and full time February to December, 1967. His time spent on the project before September, 1966 was given by the Bio-Medical Library.

3. Keypunching

Keypunching was done for all titles in the project, and all cards punched were sight checked and also checked on a printout of the cards. The work was done at the rate of 100 titles punched in 197 minutes, and sight checked in 79. The keypuncher was paid $1.94 per hour and worked part time during the period of the project. Verification with the printout was done by other personnel in the project, and in most cases, by the person in charge of checking the coding (see 2. above).

4. Other

Other labor costs which were included are: preparation and makeready for the various tasks, correction of problems, checking shelves for information. While it was not possible to get an accurate accounting of all these tasks, a figure of 10% of the total cost of the above items was judged to cover this use of personnel time adequately.

B. Costs of encoding the serials information--Equipment.

1. Coding sheets

A special form was prepared for coding the serials record information and a template made. Total cost of the forms was $150 for 10,000 copies.

2. Keypunch rental

An IBM 029 keypunch was rented from March to December, 1967 for $94 per month. In December a change in the procedure for producing arrival information made the interpreting ability of this model no longer necessary and an IBM 029 without this feature was substituted. The keypunch was used to punch both the data and the programs.

3. Cards

Seventyfive boxes of cards at $3.00 a box were used. This includes the cards necessary to prepare the programs for the computer.

4. Reference tools

Reference tools, such as the Union list of Serials, which were used, were donated by the Bio-Medical Library or by the Reference Department of Walter Library. If they had been purchased, the cost would have been approximately $75.

5. Other

Use of equipment such as desks is depreciated over a ten year period for purposes of this analysis. Each item was in use for two years, and the original cost of purchasing the equipment was absorbed by the Bio-Medical Library, which will use it at the end of the project. The following equipment was used:

3 desks	@ $100	$300	$ 60
2 tables	@ $ 65	$130	$ 26
2 files	@ $ 60	$120	$ 24
2 chairs	@ $ 50	$100	$ 20
3 chairs	@ $ 30	$ 90	$ 12
			$142

In addition a file cabinet for the tabulating cards was used on the project. Originally purchased for another activity, the use of it was so extensive that half of the price of the cabinet was charged to the serials project.

Portable card trays and a carrying case were also purchased.

C. Costs of encoding the serials information--Indirect expenses.

1. Systems Analyst

During the two years of the project, three-fourths of the analyst's time was spent on creating, directing, and coordinating the project.

2. Research fellow

A research fellow was connected with the project part-time during the period September, 1966 to December, 1967 in order to do the cost analysis. The time spent on the project was equivalent to about six weeks of full-time work. This time was donated by the Library School.

3. Other--Building overhead

Although figures of this nature are very difficult to obtain within the University, a general figure of 25% of the unabsorbed direct costs is used as a basis for this item. In general, most of the items included in this figure were given by the Bio-Medical Library (maintenance, space, etc.).

D. Programming.

1. Programmer

It took one man-year to program and debug the needed programs. While some effort is still being expended in this direction, this is included as a part of the continuing costs, and will be considered part of these contiuing costs.

2. Other personnel

Almost all work done on the programming phase of this effort was done by the programmer. Some keypunching was done by the keypuncher hired by the project. Computer operation and maintenance was covered by the grant given to the Bio-Medical Computer Center and no estimate has been made of this cost, except as covered by the estimate for computer time (see below).

3. Correction and Updating

Correction of the data base was eased by use of a master audi program which "caught" many of the corrections to be made. These corrections were made by two students working 22 hours per week each January through March, 1968. During this time the average pay of the group was $2.92 per hour.

E. Equipment.

1. Tapes

A carton of 10 tapes purchased for $300 was used.

2. Disc packs

One disc pack was used, costing $570.

3. Paper supplies

Single ply paper was given gratis by the Bio-Medical Computer Center. The cost of this paper if purchased would be approximately $300.

4. Computer time

This was donated under grant monies. It took approximately $8000 of computer time to build the files, half of which was "meaningful" and half of which was debugging.

5. Overhead

Overhead was figured as above (see item II C3).

III. Continuing costs

Continuing costs of the project will be borne by three different parts of the University. Under a Public Health Service grant, computer time and operation, as well as single ply paper, will be furnished to the Bio-Medical Library until 1969. At that time the library will have to start paying for their use of the computer. Continuing work on the project, such as programming new printouts and reprogramming or redesign of old products, will be done by the programmer and systems analyst as part of their responsibilities to the whole library system.

The Bio-Medical Library will bear the cost of a serials clerk typist who will spend part of his time punching new records, correcting old records, and in general updating the data needed for the project. At the present this person spends about ten hours a week working on this, at a rate of $1.62. Other continuing costs are for the paper and the keypunch. Multiply paper is purchased in six months supply batches at a rate of $382. Single ply paper (when it is charged for) will amount to $14 per box. At present a box to a box and a half are used monthly.

Eleven "daily" computer runs are made monthly using a maximum of 420 minutes of computer time. Monthly computer runs presently take 20 minutes apiece for each of the two audit runs, 90 minutes for the update run, 120 minutes to print the master list, and 60 to print the patron list. A total of 730 minutes, a little over 12 hours, is used for the 2000 transactions, 1300 corrections and 35 new titles put on the record each month. It is estimated that computer time will be charged at a rate of $70 per hour for the present configuration.

In Table III can be found a summary of the costs of continuing this project in both a monthly and a yearly basis. Table IV presents information showing how much more per year the new system costs.

IV. Summary

As can be seen easily from Table IV, the system costs on a continuing basis are almost twice as much as under the old system. Unfortunately it is impossible to present the whole picture since no data has been gathered yet on the relative use of both systems, nor on the time saved in serving the patron, nor on the relative usefulness to the patron of the information obtained from each system. At the present time a study is being conducted to investigate some of these questions, and when it is completed, it should show whether this new system is used and preferred over the other by the patrons. All the present summary has tried to do is to investigate the hard dollar costs of automating the serials records and of the upkeep of such a system.

TABLE I

STEP	RATE/HOUR	RATE/MINUTE	TIME/ACTIVE TITLE	COST/ACTIVE TITLE	COST/TOTAL ACTIVE TITLES	TIME/INACTIVE TITLE
coding	$2.76(av)	$.05	11.7 minutes	$.58	$1450	13.0 minutes
bindery (prep) Shelves	$1.75	$.03	5.3 minutes	$.16	$ 400	NA
Acq. info.	$3.00	$.05	1.1 minutes	$.06	$ 150	NA
frequency	$4.00	$.07	2.4 minutes	$.17	$ 425	NA
TOTALS			20.5 minutes	$.97	$2425	13.0 minutes

STEP	COST/INACTIVE TITLE	COST/TOTAL INACTIVE TITLES	TIME/AVERAGE TITLE	COST/AVERAGE TITLE	COST FOR TOTAL TITLES
coding	$.65	$2275	12.6 minutes	$.63	$3800
Bindery (prep) shelves	NA	NA	2.2 minutes	$.07	$ 400
Acq. info.	NA	NA	.5 minutes	$.02	$ 100
frequency	NA	NA	1.0 minutes	$.07	$ 400
TOTALS	$.65	$2275	16.2 minutes	$.78	$4700

TABLE II

Costs of Creating the Automated Serials Record

Type of Activity	Source of Funds: Bio-Medical Library	University Library	Public Health Service Grants[1]	TOTAL
A. 1. Coding (see Table I)			4700	4700
Retirement of old file			1600	1600
Miscellaneous			500	500
2. Checking: assigning deck number before September, 1966-absorbed	6050 (200)			6050 (200)
3. Keypunching			700	700
4. Other	1350			1350
SUB-TOTALS	(200) 7400	(000) 000	(000) 7500	(200) 14,900
B. 1. Coding sheets	150			150
2. Keypunch			940	940
3. Cards			225	225
4. Reference tools	(50)	(25)		(75)
5. Equipment	(190)			(190)
SUB-TOTALS	(240) 150	(25) 000	(000) 1165	(265) 1315
C. 1. Systems Analyst		15,000		15,000
2. Research fellow		(1,000)[2]		(1,000)
3. Building overhead	(4,000)			(4,000)
SUB-TOTALS	(4,000) 000	(1,000) 15,000	000 000	(5,000) 15,000
D. 1. Programmer		4,500[3]	5,500	10,000
2. Other personnel				---
3. Corrections			1,700	1,700
SUB-TOTALS	(000) 000	(000) 4,500[3]	(000) 7200	(000) 11,700
E. 1. Tapes			300	300
2. Disc Packs			570	570
3. Paper Supplies			(300)[4]	(300)
4. Computer Time and Overhead			(8,000)[4]	(8,000)
5. Overhead	(3,000)			(3,000)
SUB-TOTALS	(3,000) 000	(000) 000	(8,300) 870	(11,000) 870
TOTALS	(7,440) 7,550	(1,025)[2] 19,500[3]	(8,300)[4] 16,735[1]	(16,765) 43,785 $60,550

Explanatory Notes: 1. Two Public Health Service grants were used during this project. The first was one granted directly to the Bio-Medical Library for use in setting up this serials project and for doing other activities, such as ordering new serials. All items in [illegible]is column which are not in parentheses were paid [illegible]r with

2. This is the salary paid by the Library School for the research fellow who participated in the project.
3. This part of the salary of the programmer was paid by a special administrative grant to the University Library.
4. The items in parentheses in this column were paid for with a Public Health Service grant to the Bio-Medical Computer Center who in turn made the paper and computer time free to the project.

TABLE III

Costs of Continuing the Bio-Med Serials Project

A. Personnel	Month	Year
Systems analyst-absorbed	---	---
Programmer-1/4 time equivalent	250	3,000
Keypunch/serials assistant	250	3,000
Serials Librarian	550	6,600
Serials Assistant	430	5,200
B. Supplies		
Paper-single ply	20	240
Paper-multiple ply	62	750
Cards	6	70
Keypunch rental	62	750
Computer Time	840	10,000
	2,470	29,610
Cost/Transaction	$ .71	

TABLE IV

Manual Serials Versus Automated Serials Processing

Manual		Automated
6,600	Serials Librarian	6,600
5,200	Serials Assistant	5,200
3,000	Clerk/typist	3,000
70	Supplies	1,060
	Programmer	3,000
	Keypunch	750
	Computer Time	10,000
14,870		29,610
	Manual	14,870
Cost of automated system over manual/year		14,730

Figures - summarized raw data A Form

	# Active	Inactive	Total	Min/act.	Inactive	Total
A	54	83	137	7.3	8.7	8.1
	393	720	1113			
B	28	65	93	16.3	11.8	13.0
	458	766	1224			
C	17	45	62	14.3	17.0	16.8
	244	798	1042			
w/o batch checks	10	217	227	13.8	12.9	13.1
	234	581	815			
D	10	25	35	17.3	13.3	14.4
	173	332	505			
E		17	17		27.0	
		460	4			
F	10	25	35	12.3	11.7	11.9
	123	292	415			
TOTALS	119	260	379	11.7	13.0	12.6
	1391	3368	4759			

Activities			B Form
Key punching	# titles	102	
$1.94	time	199	
Checking keypunching	titles	102	
	time	80	
Bindery info (from shelves & bindery prep.) picking up copies, coding, returning to shelves -	titles	92	
	time	360	
Coding bindery 61-69	titles	62	/title 1.3
	time	79	
Frequency codes	titles	161	/title 2.4
	time	392	
Assign deck nos./check sheets	titles	79	
	time	140	
Subscription info 38-58	titles	119	/title 1.1
	time	125	
Preparation/make ready	titles	78	
	time	145	
Cross reference problems corrections	titles	15 + 35	
	time	2	

8. PROBLEMS

During the data conversion stage considerable planning was done to minimize redoing work or inefficiently delegating the various tasks to be done. Balancing the operations such as the collection of data on code sheets, the checking of the code sheets, and the finally keypunching and auditing the input on the computer was somewhat of a problem, since our coders were more efficient at turning out clean data than we believed. Work pile-up centered about the code sheet checking which was handled by two people, versus four coding and one person keypunching. However, our coders finished initially coding records prior to the deadline, givin the checkers a month to clean up the backlog. This proved to be more than ample.

Program development proceeded in an optimum manner as each piece of software needed to build the file and correct or update it was quite well debugged by the required time. As in any computer based system minor bugs periodically turned up in our operational software but all were corrected as they occurred, causing only a day or two turnaround time at most to resume operations.

Installation of the check-in system up to this point has given us the most problem. First, the adjustment of each record to bring it to current status and also doublecheck it took 7 weeks, putting us 3 weeks behind schedule. At this point several program bugs and scheduling of our runs in the computer center held us up another 4 weeks from having the check-in system fully operational. Consequently, we had to begin this phase by cumulating the check-in list predicted arrivals for the months September, October, November, December. These then had to be compared against the Master file listing to check off issues which had already been entered by using a Serials Arrival Form. Also, predictive codes, or other errors causing the wrong information had to be cleared up. With the January check-in list of expected arrivals another check of each record was made and adjustments made as needed. This check-in system began full operation in

January 1968 but originally we thought we could meet an October 1, 1967 deadline. For the library staff, this deadline extension meant that our parallel manual and mechanized check-in operations for active titles were continued for almost three months rather than at most one month. However, this proved to be worth the additional work since several program bugs had turned up causing record dropping. At the end of December we were able to drop the manual system completely.

Clerical procedures for the check-in operation, record correction, and file updating were evolved without any real problems and we now have a control over the file which did not exist before. Now all changes must go through the serials assistant and librarian to be effective, whereas previously anyone with a pencil could change or correct the card file.

Staff training went very smoothly since the serials librarian, serials assistant, keypunch operator, and student assistants assigned to the serials section worked with each phase of the system as it developed. User documentation for the operation of the system has been rough draft compiled and final typing should be completed by Summer 1968. Program documentation is about one-third completed and is scheduled to be completed by June 1968. There should be no problems associated with this task, but merely the compilation of the techniques and procedures into written form. Since we are switching to MASTER, a new operating system, this work has been delayed to reflect the new system.

Development of the batch processing system will continue only through the Bindery Operations. At that point we will proceed to change or correct only minor points as they arise and direct our development efforts to a new on-line mode system. We expect that the Bindery operation now being developed will be operational by June 1968, especially since this library now needs this subsystem because of the recent internal changes involving preparation of this library's shipments. This will be the most straight forward task to accomplish. It should take only half the time of the check-in sub-system or even less to install and become operational. Programming of the Bindery Ready List and the Bindery Instruction Form are all that remains to be done for full operation of the Bindery operations.

9. CONCLUSIONS

This project was the first effort toward computer based library record systems in the University Libraries. Because of the experienced project staff, close communication between the Bio-Medical Library Staff and the project personnel, and realistic goals, a high degree of success has been achieved. This system was designed as a groundwork system to test ideas in an operational environment and build machine readable Serial files as a basis for an on-line system having wide application to our total library situation. The Bio-Medical Library has served as a good laboratory for this and will continue to be used to test our systems concept before wider applications are attempted. On this basis, together with the urgent need in the medical sciences programs for updated services, we feel the effort and cost of such systems justified since their benefit is but one component in long range medical sciences regional planning and long range total library planning.

10. FUTURE SERIALS SYSTEM PLAN

When we have completed documentation, further debugging, and cleaning up of the check-in sub-system, Bindery sub-system, and the total serials system package we intend to begin development of the third generation system--an on-line CRT console based system. Our first step will be to transfer our master file from tape to Disk and do all of our processing on the Disk. This cabability must be developed to enable our on-line system to function. Next we will devise procedures for handling check-in, record inquiry, and update using a CRT console. Designs of our disk based files must be prepared and software written to convert our tape master to disk, along with suitable routines for the applications we wish to perform as displayed output. Some file design changes and new categories of information may be added. Many of these application routines will be essentially the same as in the batch system, such as auditing the input transactions, updating the holdings statement, etc. We estimate it will take one more year of programming time to create a system and software to carry the file inquiry, check-in, bindery, and update operations on-line.

From the point of original development of the batch system we have felt that we should plan our system carefully to make it as easy as possible to transfer to this next system development. Since our computer center is geared to an on-line operation mode serving the University Hospital community, we have a center able to handle our basic requirements. Equipment of a peripheral nature necessary to the operation of the library systems will be a disk drive which will keep the library files on-line to the system and CRT console displays in the library connected to a controller by direct cable. Cost of these units would amount to $14,000 per year rental or $30,255 for outright purchase. Since such equipment usage would be planned for a 3-5 year period and reasonable used equipment markets exist, the purchase of these items would save money in the long run. Equipment maintenance of about $1200 per year would be the only on-going cost associated with this equipment. Such expenditures do not seem out of line for a library of this size when compared to usage and total budget of the library or its regional services in this area to other medical personnel and institutions.

11. APPENDIX

11 A. FIGURES

FIGURE 2.

JOURNAL CHECK-IN

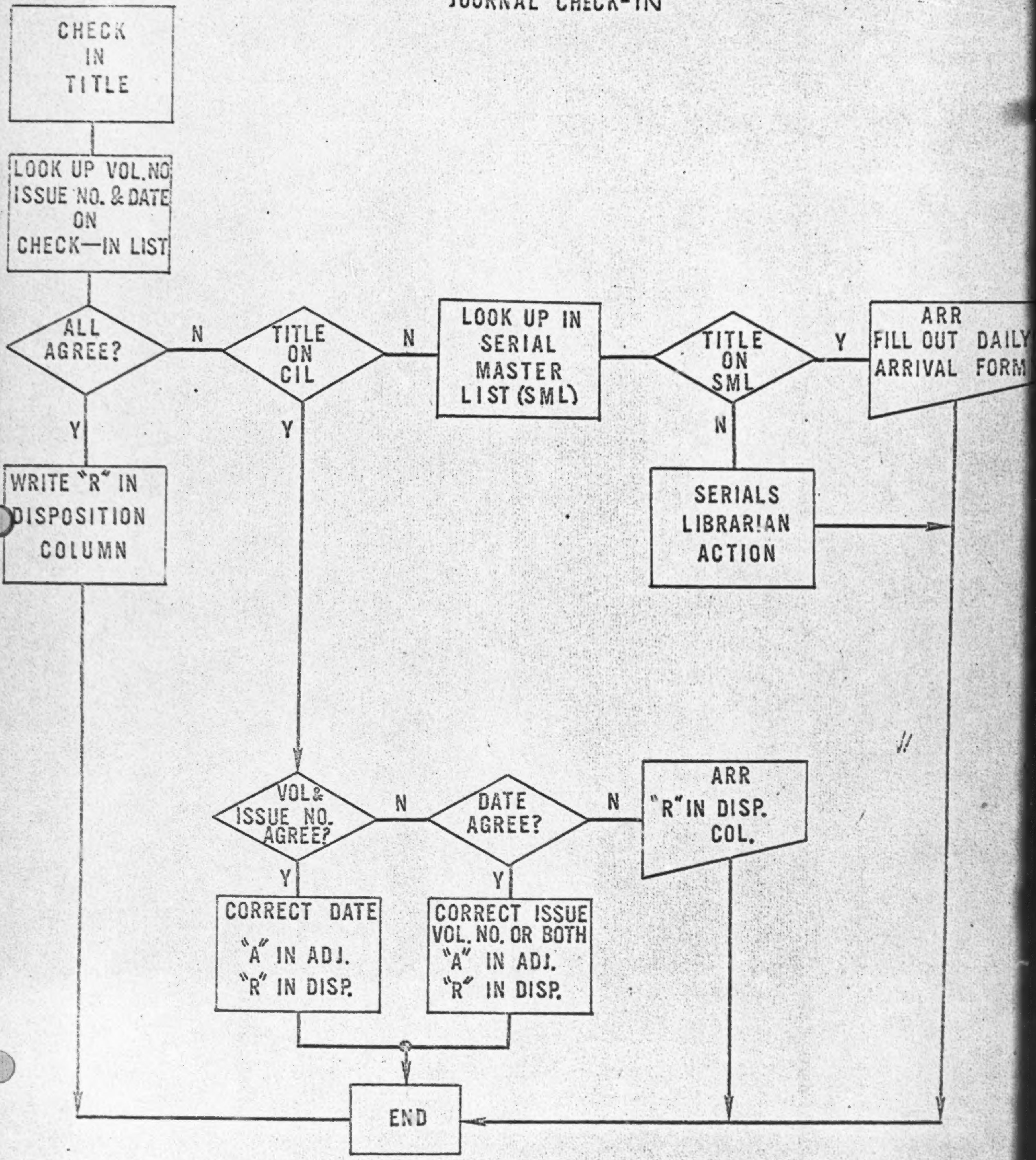

CHECK IN TITLE
LOOK UP VOL. NO ISSUE NO. & DATE ON CHECK—IN LIST
ALL AGREE?
N
Y
TITLE ON CIL
N
Y
LOOK UP IN SERIAL MASTER LIST (SML)
TITLE ON SML
Y
N
ARR FILL OUT DAILY ARRIVAL FORM
WRITE "R" IN DISPOSITION COLUMN
SERIALS LIBRARIAN ACTION
VOL& ISSUE NO. AGREE?
N
Y
DATE AGREE?
N
Y
ARR "R" IN DISP. COL.
CORRECT DATE "A" IN ADJ. "R" IN DISP.
CORRECT ISSUE VOL. NO. OR BOTH "A" IN ADJ. "R" IN DISP.
END

FIGURE 3.

MONTHLY CYCLE

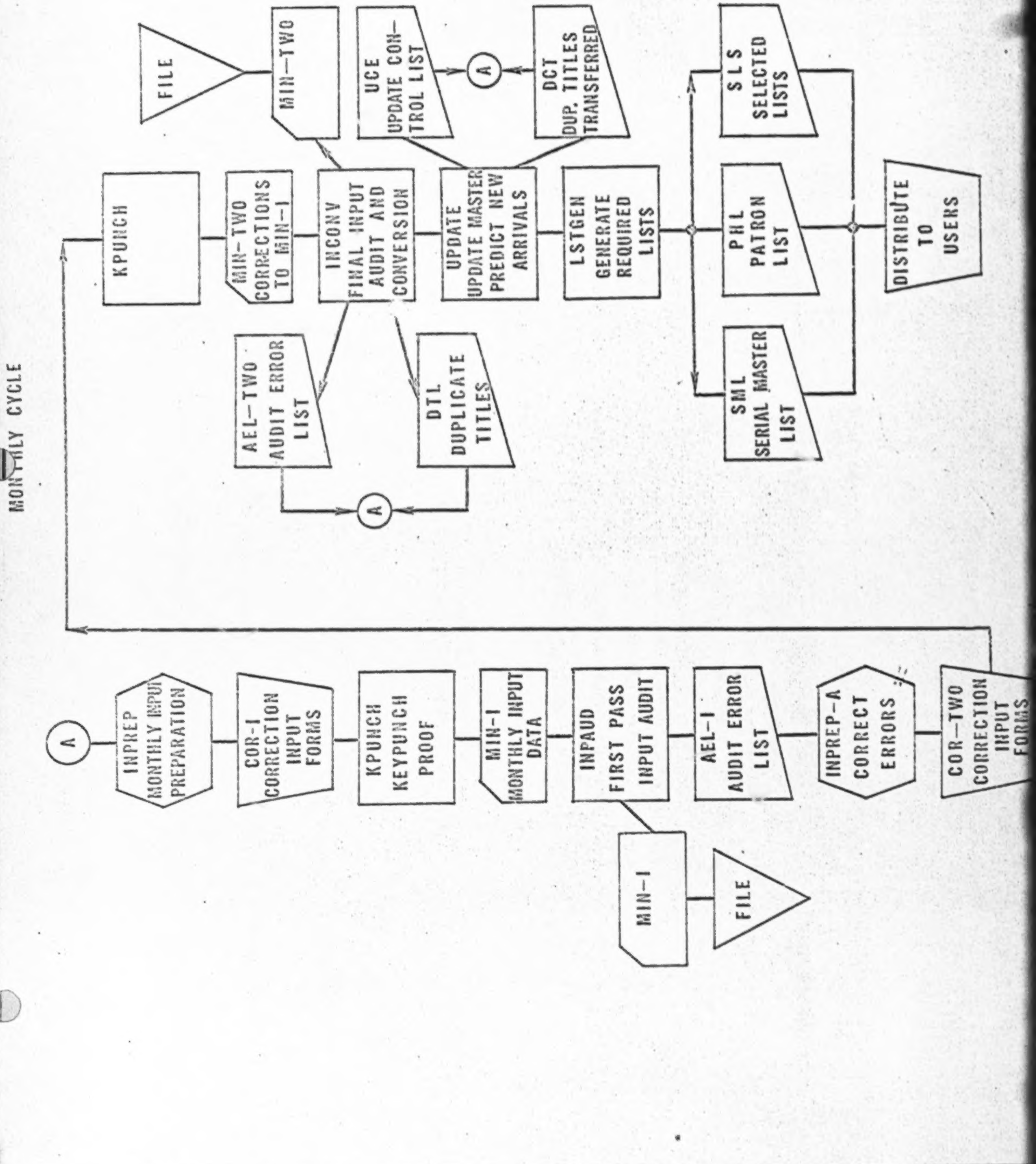
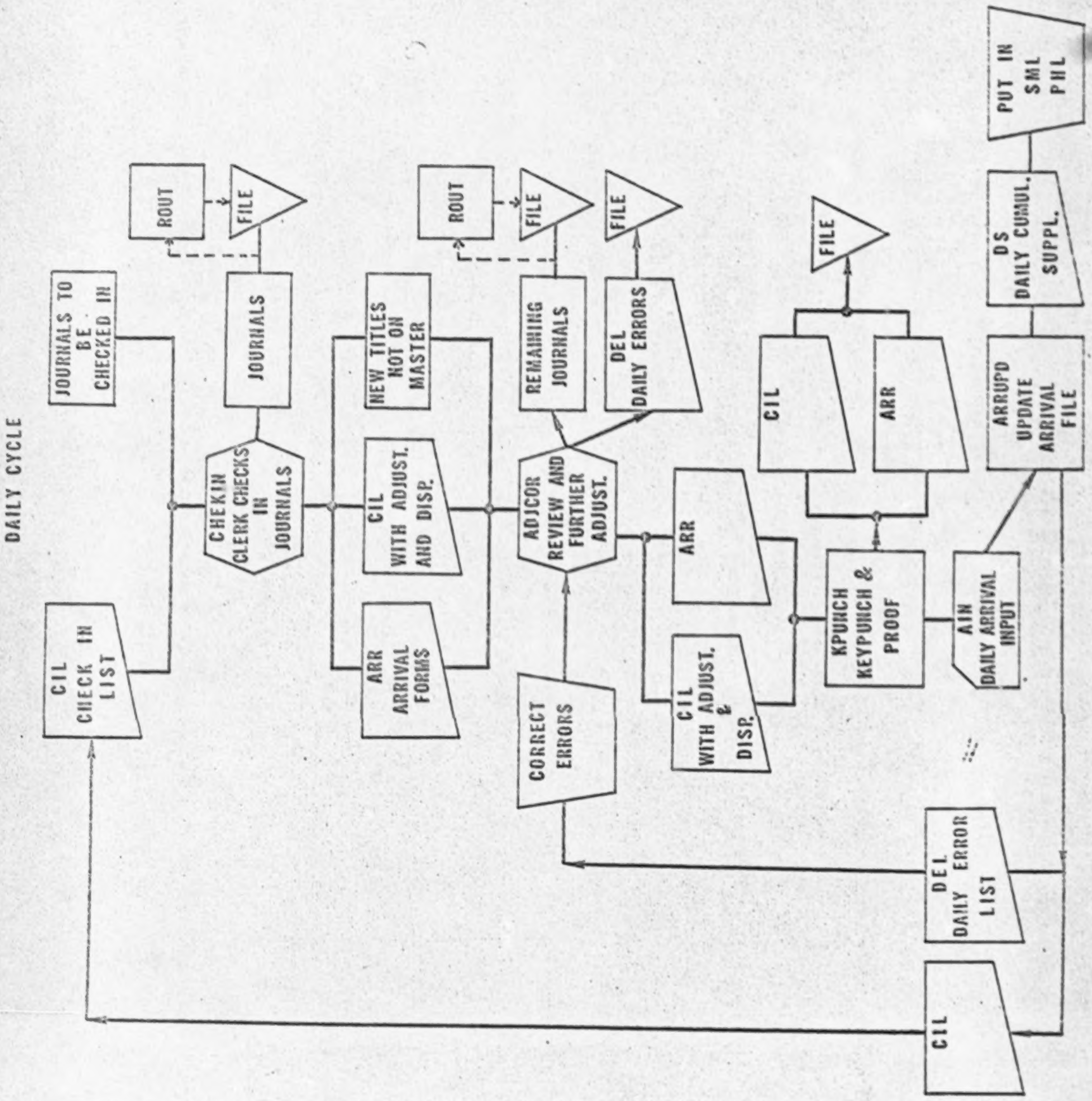

MONTHLY CYCLE
A
INPREP
MONTHLY INPUT
PREPARATION
COR-I
CORRECTION
INPUT
FORMS
KPUNCH
KEYPUNCH
PROOF
MIN-I
MONTHLY INPUT
DATA
INPAUD
FIRST PASS
INPUT AUDIT
MIN-I
FILE
AEL-I
AUDIT ERROR
LIST
INPREP-A
CORRECT
ERRORS
COR—TWO
CORRECTION
INPUT
FORMS
KPUNCH
MIN—TWO
CORRECTIONS
TO MIN-I
INCONV
FINAL INPUT
AUDIT AND
CONVERSION
AEL—TWO
AUDIT ERROR
LIST
DTL
DUPLICATE
TITLES
A
MIN—TWO
FILE
UPDATE
UPDATE MASTER
PREDICT NEW
ARRIVALS
UCE
UPDATE CON-
TROL LIST
A
DCT
DUP. TITLES
TRANSFERRED
LSTGEN
GENERATE
REQUIRED
LISTS
SLS
SELECTED
LISTS
PHL
PATRON
LIST
SML
SERIAL MASTER
LIST
DISTRIBUTE
TO
USERS

FIGURE 4.

DAILY CYCLE


DAILY CYCLE
CIL
CHECK IN
LIST
JOURNALS TO
BE
CHECKED IN
CHEKIN
CLERK CHECKS
IN
JOURNALS
JOURNALS
ROUT
FILE
ARR
ARRIVAL
FORMS
CIL
WITH ADJUST.
AND DISP.
NEW TITLES
NOT ON
MASTER
ROUT
FILE
CORRECT
ERRORS
ADJCOR
REVIEW AND
FURTHER
ADJUST.
REMAINING
JOURNALS
DEL
DAILY ERRORS
FILE
CIL
WITH ADJUST.
&
DISP.
ARR
KPUNCH
KEYPUNCH &
PROOF
CIL
ARR
FILE
AIN
DAILY ARRIVAL
INPUT
ARRUPD
UPDATE
ARRIVAL
FILE
DS
DAILY CUMUL.
SUPPL.
PUT IN
SML
PHL
DEL
DAILY ERROR
LIST
CIL

11 B. OUTPUT SAMPLES

[illegible]

INDEX TO PRINTED OUTPUTS for SYSTEM BIO-MEDICAL LIBRARY SERIALS SYSTEM

PAGE

ANALYST Karen D. Strom

CLIENT

CONTROL

DATE 06/18/68

I.D.	DESCRIPTION	SOURCE PROGRAM	FREQ. OF ISSUE	FORM NO.	COPIES	BALANCING & CONTROL REQUIREMENTS	DECOL.	BURST	BIND	DESTINATION
IPL	Input Proof List	LS0950	on req.	standard	1	none				Serials Section
AEL	Audit Error List	LS1000	month	standard	1	see Process "INPAUD", "UPDATE"			X	Serials Section
UCE	Update Control Sheet	LS2100	month	standard	1	see Process "UPDATE"			X	Serials Section
DCT	Duplicate Transferred Code Numbers	LS2150	month	standard	1	""			X	Serials Section
SML	Serials Master List	LS3000	month	standard	4	see Process "LSTPRT"	X		X	1,4 - Serials 2 - Reference 3 - Circulation
PHL	Patron Holdings List	LS3000	month	standard	4	see Process "LSTPRT"	X	X	X	Library Main and Lower floor
ARE	Arrival Error List	LS4100	daily	standard	1	see Process "ARRUPD"			X	Serials Section
DMS	Master List Supplement	LS4125	daily	standard	4	none	X	cop 4	X	1 - Serials 2,3 - Ref and Circ 4 - Main floor
CIL	Check-In List	LS4100	weekly	standard	1	none			X	Serials Section
BRL	Bindery Ready List	LS4125	month	standard	1	none			X	Serials Section
SLS	Selected Lists	LS3100	on req.							Selected Distribution
BDS	Binding Slips	LS4200	weekly	bindery forms	2	none		X		Serials Section

```
                                        UNIVERSITY OF MINNESOTA BIO-MEDICAL LIBRARY                          PAGE    10
                                         INPUT AUDIT ERRORS - NEW AND CORRECTIONS
                                                        APRIL 1968
CARD COLUMNS - CARD 1
0         0 1 1 1  1  1 1      2      3        3 4   4     5     5   6 6   6 6    7 7      C
1         9 1 2 3  5  8 9      5      1        9 0   4     0     6   1 2   5 6    2 3  TR D DECK
                                                                                                5551
AR267375 C1 A 3 38 025   011000 333213         S                     1 330   E3300 2 3  S5 1 5439 ILLEGAL COL   40    OK
                                                                                                  ILLEGAL COL   44    TC
                                                                                                  ILLEGAL COL   50
                                                                                                  ILLEGAL COL   56

IN826103 C1                                                                             S5 1 5469 -5552
         $$$$TITLE VARIES: VOL. 1-33 NEW YORK MEDICAL JOURNAL; VOL. 34-36 NEW YORK M       2 5469 INCOMPLETE RECORD
         EDICAL JOURNAL AND OBSTETRICAL REVIEW; VOL. 37-77 NO. 24 NEW YORK MEDICAL J       3 5469                    OK TC
         OURNAL...; VOL. 77 NO. 25-VOL. 82 NEW YORK MEDICAL JOURNAL AND PHILADELPHIA       4 5469
          MEDICAL JOURNAL; VOL. 83-114 NEW YORK MEDICAL JOURNAL INCORPORATING THE PH       5 5469
         ILADELPHIA MEDICAL JOURNAL AND THE MEDICAL NEWS; VOL. 115-118 NEW YORK MEDI       6 5469
         CAL JOURNAL AND THE MEDICAL NEWS; VOL. 119-138 MEDICAL JOURNAL AND RECORD;        7 5469
         VOL. 139-163 MEDICAL RECORD.  1951, ABSORBED GENERAL PRACTICE CLINICS.  NO        8 5469

         MORE PUBLISHED.  ABSORBED BY ANTIBIOTICS AND CHEMOTHERAPY$$$$*                    2 5469 CARD OUT OF SEQUENCE
HI337500 C1                                                                             S5 1 5475 -5553
         ARCH RIO JARD BOT$RIO DE JANEIRO. JARDIM BOTANICO. ARCHIVOS$$$$$$$ *              2 5475 $ OR END OF REC INC   OK TC

SV517853 C1                                                                             S5 1 5478 -5554
         $SVENSKA VAEXTGEOGRAFISKA SAELLSKAPET, UPSALA. ACTA PHYTOGEOGRAPHICA SUECIC       2 5478 INCOMPLETE RECORD     OK TC
                                                                                          3
         A$$$$$$$*                                                                        2 5478 CARD OUT OF SEQUENCE
IN029736 C1                                                                             S5 1 5492
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SA916608 C1 SARGENTIA; A CONTINUATION OF THE CONTRIBUTIONS FROM THE ARNOLD ARBORETUM OF HARVAR    5565TITLE       CORRECTION
            D UNIVERSITY$

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ACTA PATHOLOGICA ET MICROBIOLOGICA SCANDINAVICA	*AC709186	C1	U	71	4			1967	-CPR	005	5	S	7. .C	. .	7
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                 SOUTH AFRICAN↓MEDICAL↓JOURNAL.

S S0854304 C1    ANN S AFR MUS.                                                 A 2   3   012000 0   1    50    5     C 09 081266 330
               SOUTH AFRICAN MUSEUM. ANNALS.                                      143     7      41          1968       09 000160 E2302
                 CAPE TOWN.                                                                                                  0048
                 B1-46,U47N1,3,U48,49N1,U50N1-9,(1898-DEC  1967).
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S S0864012 C1    J S AFR ORNITHOL UNION.                                        I 2   3          0   1
               SOUTH AFRICAN ORNITHOLOGISTS UNION. JOURNAL.                       MUS            47
                 PRETORIA.
                 B1-6,U7N1,(1905-     1911).
                 B590.6 S<0>8.

X S0868866     SOUTH AUSTRALIA. DEPARTMENT OF PUBLIC HEALTH. PUBLIC HEALTH
                   NOTES AND HEALTH NOTES FOR SOUTH AUSTRALIA
                 SEE GOOD HEALTH FOR SOUTH AUSTRALIA.
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SOUTH AFRICAN JOURNAL OF NATURAL HISTORY. PRETORIA.
BD.1-5, UNBD.6:NO.1,(1918-JUN 1926).
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*SOUTH AFRICAN JOURNAL OF SURGERY. JOHANNESBURG.
UNBD.1-2,3:NO.1,3-4, UNBD.4,5:NO.1,3,(1963-SEP 1967).
LOCATION: STACK NUMBER 143

*SOUTH AFRICAN MEDICAL JOURNAL. SUID-AFRIKAANSE TYDSKRIF VIR GENEESKUNDE. CAPE TOWN.
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(1932-JAN 27,1968).
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*SOUTH AFRICAN MUSEUM. ANNALS. CAPE TOWN.
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(1898-DEC 1967).
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*SOUTH AUSTRALIA. INSTITUTE OF MEDICAL AND VETERINARY SCIENCE. ANNUAL REPORT OF THE COUNCIL. ADELAIDE.
UNBD.1-2,6-7,12-13,15-16,18-26,(1938-1964).
LOCATION: STACK NUMBER 143

SOUTH CAROLINA. UNIVERSITY. UNIVERSITY OF SOUTH CAROLINA PUBLICATIONS. SERIES 3. BIOLOGY. COLUMBIA.
BD.1, UNBD.2:NO.1-4, UNBD.3:NO.1,(1952-MAR 1960).
LOCATION: STACK NUMBER 143

SOUTH DAKOTA. BOARD OF DENTAL EXAMINERS. BIENNIAL REPORT. SIOUX FALLS.
UNBD.78-79,(1961-JUN 30,1964).
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SOUTHERN CALIFORNIA PRACTITIONER. LOS ANGELES.
BD.1-3, UNBD.6:NO.1,8, UNBD.10:NO.1-2,9, UNBD.11:NO.9-12,
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SOUTHERN CLINIC. RICHMOND.
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UNBD.40:NO.1,(1901-JAN 1917).
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SOUTHERN DENTAL JOURNAL AND LUMINARY. MACON, GEORGIA.
BD.9,16-19,(1890-OCT 1900).
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*SOUTHERN HOSPITALS. CHARLOTTE, NORTH CAROLINA.
BD.27, UNBD.30:NO.1-7,9-12, BD.31-34, UNBD.35,36:NO.1-2,
(1959-FEB 1964).
LOCATION: HAMILTON COLLECTION

SOUTHERN JOURNAL OF THE MEDICAL SCIENCES. NEW ORLEANS.
UNBD.1:NO.1-3,(1866-NOV 1866).
MERGED INTO NEW ORLEANS MEDICAL AND SURGICAL JOURNAL AFTER VOL. 2 NO. 3.
LOCATION: STACK NUMBER 143

SOUTHERN MEDICAL ASSOCIATION. JOURNAL. SHREVEPORT, LOUSIANA.
UNBD.6:NO.1-5,(1909-MAY 1909).
SUPERSEDES MEDICAL RECORDER. MERGED INTO GULF STATES JOURNAL OF MEDICINE AND SURGERY AND MOBILE MEDICAL AND SURGICAL JOURNAL.
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BRITISH J OPHTHALMOL                                                                                   BR513874
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BRITISH JOURNAL OF PSYCHIATRY                                           -CPR  STACK NUMBER 036  BR592576
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BRITISH JOURNAL OF RADIOLOGY. NEW SERIES                                -CPR  STACK NUMBER 036  BR611094
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06/18/68

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Variable Field Information. As many cards as necessary. Card nos. 2-9, A-Z.			Dock No. card no.	New record or Correction
CODE NO.	Also	NEW CODE NO. Also S 1 K 9		Delete or Transfer
CODE NO.	Also	I M ABBREV TITLE Date Sent Lot No. series volume supplement Bound part: 1st issue, last issue Year routing loc circ type 6 correct disp. seq no		Bindery Update
CODE NO.	Also	I M ABBREVIATED TITLE series volume issue supplement Date: Mo Day Year routing loc circ 7 adjust disp. seq no.		Arrival Update

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Application [illegible] by [illegible] Date 05/15/63 Job No. ______ Sheet No. ______

Current Date [illegible]	Previous Date [illegible]	Report Date Month Year	[illegible]	[illegible]	Block Size (Tracks)	[illegible]	C	INPAUD UPDATE Control Card
Report Date	[illegible]						C	ARRUPD Control Card
Current Date	Previous Date	Report Date		List Type	Restart Page Number		C	LSTPRT Control Card
Report Date							C	IS4000 Control Card

[illegible] LIBRARY SERIALS SYSTEM

MASTER FILE LAYOUT

Karen B. Stern

03-07-68

First record on tape is 80 char BCD label record.

Remainder of file is written in Binary mode. Density 556bpi.

Logical record size is variable. Maximum tape block size is 1036 characters. Logical records are wholly contained within a block unless the block size is exceeded in which case the record is continued in next block.

CODE NUMBER (BINARY)

[illegible] | [illegible] | [illegible] | RECORD SIZE (BCD, CHAR)

CHARACTER SIZE OF EIGHT VARIABLE FIELDS

VF 1 | VF 2 | VF 3 | VF 4 | VF 5 | VF 6

VF 7 | VF 8 | [illegible] | [illegible] | SUBJECT | LOC | [illegible] | #VOL YR | # ISS VOL | [illegible] YEAR | FREQUENCY CODE | Volumes ready for bindery | [illegible] | DEALER | [illegible]

LAST INV DATE M M D D Y Y | AMOUNT PAID D D D D C C | EXP DATE M M Y Y | [illegible] | # ISS PRED | LAST VOL PRED

LAST ISSUE PRED | LAST DATE PREDICTED | LAST [illegible] PRED

VARIABLE FIELD INFORMATION BEGINS HERE. Each variable field is terminated with a $. Record is terminated with one or more $ to make the record size a multiple of 4 characters. The variable field character size includes the dollar sign. If the record exceeds the maximum tape block size the variable field information is continued in the next block as follows:

CODE NUMBER | [illegible] | [illegible] | RECORD SIZE

This portion of a continuation block is unused. Sequence no. is incremented by 1 (may go from 1-9, a-z). The record size is only the number of characters contained within one block. (Max rec size is block size)

CONTINUATION OF VARIABLE FIELD INFORMATION.......

9 9 9 9 9 9 9 9 | 7 | 7 | 7 | 1 | 0 0 2 4 | LAST LOGICAL RECORD IN THE FILE

TAPE RECORD LAYOUT [illegible]

[illegible] [illegible]	PROGRAMMER Karen D. Stone	REMARKS
[illegible] [illegible]	DATE 03-07-68	

[illegible]	▨	[illegible]	RECORD SZ (BCD,CHAR)	[illegible] SIZE CROSS-REF (BINARY)	▨	CROSS-REFERENCE [illegible] Field

(end record) is terminated with one or more ¥ to make the record size a multiple of 4 characters. If the record exceeds the maximum tape block size the variable data is continued in the next block the same as a MASTER SERIAL RECORD.

[illegible] RECORD LAYOUT SERIAL AND [illegible] FILE

[illegible]	[illegible] Susan B. [illegible]	Primary record = type 6. Record size is 1[illegible] characters, fixed. Block size is 1[illegible] characters.
[illegible]	06/10/62	

[illegible]	Copy	Index Medicus Abbreviated Title

[illegible]	3	volume	supplement	Bound portion 1st issue	Bound portion last issue	P%	[illegible]	[illegible]	Year	[illegible]	loc	[illegible]	type	6	[illegible]	[illegible]	[illegible]	seq no

Date Sent: M M D D Y Y

Lot number

First eighty characters of full title .. . . . ———

. . . . ———

[illegible]	[illegible]	Serial record - type 7 Record size is 1[illegible]0 characters fixed Block size is 1[illegible]80 characters
[illegible]	[illegible]	

[illegible]	Copy	Index Medicus Abbreviated Title

[illegible]	3/[illegible]	volume	issue	P%	supplement	[illegible]	Date M O N	Date D A	Date Y E A R	[illegible]	loc	[illegible]	[illegible]	▨	7	[illegible]	[illegible]	seq no

First eighty characters of full title . . . . . ———

. . ... . ———

RECORD LAYOUT [illegible] FILE [illegible]

[illegible]	[illegible]		[illegible]	
	DATE 03/14/68		[illegible]	

[illegible]	[illegible]	[illegible]	W 1	W 2	W 3	W 4	W 5	W 6
W 7	W 8	[illegible]			frequency code			[illegible]
[illegible]	[illegible]	expiration date	[illegible]	[illegible]	[illegible]		desk number	VARIABLE

[illegible] INFORMATION [illegible]. Each variable field is terminated with a dollar sign. Record is terminated with one or more asterisks to make the record size a multiple of 4 characters. The variable field character size includes the dollar sign. If the record exceeds the maximum tape block size the variable field information is continued in the next block as follows

[illegible]	[illegible]	[illegible]	This portion of a continuation block is unused. Sequence no. is incremented by 1 (say go from [illegible]). The record size is only the number of characters contained within one block. (Maximum record size is block size).

CONTIN-

LAYOUT OF VARIABLE FIELD INFORMATION . . . .

[illegible] RECORD LAYOUT [illegible] TRANSACTION FILE (sorted and unsorted)

[illegible]

[illegible]

Transaction type 5 or 9 – [illegible] record. Record size is [illegible] characters. Logical records are wholly contained within a block. Block size is [illegible] characters.

[illegible]

volume

supplement

issue

Transaction type 6 – history

Record size is [illegible] characters. Logical records are wholly contained within a block. Block size is [illegible] characters.

Index Medicus Abbreviated Title

Transaction type 7 – serial

Record size is [illegible] characters. Logical records are wholly contained within a block. Block size is [illegible] characters.

volume

issue

supplement

Index Medicus Abbreviated Title

[illegible]

[illegible] record) is terminated with one or more asterisks to make the record size a multiple of 4 characters. If the record size exceeds the maximum tape block size the variable data is continued in the next block the same as Transaction 25 or 35.

11 D. INDEX TO PROGRAMS

[illegible] BIO-MEDICAL LIBRARY SERIALS SYSTEM [illegible]

[illegible] Karen D. Strom [illegible] [illegible] [illegible] 06/16/69

PROGRAM NO.	PROGRAM DESCRIPTION	FREQ. OF RUN	AVER. RUN TIME (min)	MACHINE (CDC)	SOFTWARE SUMMARY			INPUT - OUTPUT MEDIA													
					OPERATING SYSTEM	STANDARD PROGRAM	LANGUAGE	REMOTE	[illegible]		[illegible]		CARDS		[illegible]	[illegible]		DISK			
									I	O	I	O	I	O		I	O	I	O	I	O
[illegible]	Audit, Convert Input	month.	10	3300	MASTER		FORTRAN		X	X			X		X			X	X		
[illegible]	Sort Input	month.	5	3300	MASTER	SORT/ MASTER			X	X			X		X			X	X		
[illegible]	Update Serials Master File	mon.	50	3300	MASTER		FORTRAN		X	X			X		X	X	X	X	X		
[illegible]	Purge Transfers, Predict Arrivals, Bindery	month.	20	3300	MASTER		FORTRAN		X	X			X		X	X	X	X	X		
[illegible]	Sort Transfers	month.	3	3300	MASTER	SORT/ MASTER			X	X			X		X			X	X		
[illegible]	Print Serials Staff and Patron Lists	month.	180	3300	MASTER		FORTRAN		X	X			X		X	X					
[illegible]	Selected Lists (Loc.,Sub.)	on request	200 rec/min	3300	MASTER		FORTRAN		X	X			X		X	X		X	X		
[illegible]	Want List Unbound List	on request	50 rec/min	3300	MASTER		FORTRAN		X	X			X		X	X		X	X		
[illegible]	Merge new arrivals and bindery with Arrival File	month	15	3300	MASTER		FORTRAN		X	X			X		X			X	X		
[illegible]	Read Arrival Input Cards	daily	3	3300	MASTER		FORTRAN		X	X			X		X			X	X		
[illegible]	Sort Arrival Input	daily	3	3300	MASTER	SORT/ MASTER			X	X			X		X			X	X		
[illegible]	Daily Arrival Update	daily	15	3300	MASTER		FORTRAN		X	X			X		X			X	X		
[illegible]	Print Daily Supplement and Bindery Ready	daily	15	3300	MASTER	SORT/ MASTER			X	X			X		X			X	X		
[illegible]	Print Binding Slips	weekly	15	3300	MASTER	SORT/ MASTER	FORTRAN		X	X			X		X	X		X	X		
[illegible]	List Input for Proof	month	3	3300	MASTER		FORTRAN		X	X			X		X						
[illegible]	Generate Lookup Files	as needed	10	3300	MASTER	[illegible]			X	X			X		X		X	X	X		

11 E. BIBLIOGRAPHY OF PUBLISHED PAPERS

The following system papers were written, based upon this project by various staff members.

Grosch, Audrey N.	University of Minnesota Bio-Medical Serials System. Presented at 59th Annual Conference Special Libraries Association, Los Angeles, June 2-6, 1968.
Strom, Karen D.	Software Design for Bio-Medical Library Serials System. Submitted to Proceedings of the Annual Meeting, American Society for Information Science, Columbus, Ohio, October 20-24, 1968.

11 F. A PROPOSAL FOR ANALYZING THE COSTS OF THE SERIALS CONVERSION PROJECT IN THE BIO-MEDICAL LIBRARY BY CHARLENE K. MASON, OCTOBER 10, 1966.

Currently work is progressing on the conversion of the serial records of the Bio-Medical Library in anticipation of automating this function. At this time the coding sheets have been drawn up, preliminary manuals of instructions on how to use the coding sheets have been made, and a pilot project of coding one hundred-fifty selected titles has been completed. A grant of $6000 has been applied for, which will be used to hire more clerical help for the project and to help pay for the rental of a keypunch machine. This grant, as I understand it, will come from the administration of the University. A possible programmer has also been contacted in order that estimates can be made for programming time needed.

In anticipation of a report which will be made in the late winter of this academic year, it was suggested that a cost analysis of the project be made. This analysis would attempt to show both absorbed and unabsorbed costs (or costs directly incurred by the project). It would also try to provide some information which can be used as a guide in further cost analysis projects.

A Description of the Coding Procedures

A. As Proposed by the Systems Analyst.

This system is well outlined in Appendix A, which is the original plan as proposed by the systems analyst. In general, it limits the professional personnel to filling in only those areas which will require more judgement, such as the full title field, Index Medicus abbreviation, and also later checking the work done by the clerical staff.

B. As Actually Done by Current Personnel.

Unfortunately, the current situation at the Bio-Medical Library allows for more professional or exceptionally capable clerical assistants to work on coding the information than for a proportionate amount of clerical help. At the present there are four persons in the former category working on the project spending about 75 hours a week with one part time clerical worker who spends about 10 hours a week on the job. In order to equalize the demands on the clerk, more of the coding is being assumed by the professional staff.

As the original person works through the records assigned him, he tries to code the following information:

1. Index Medicus abbreviation
2. Full title
3. City of publication (which must either be checked against the publication itself for the latest place of publication)
4. Copies, duplicates
5. Status
6. Holdings
7. Language, subject, circulation, and retention codes
8. Issues/year, volumes/year, supplements/year, last issue and volume received for an active title
9. Location symbol
10. Notes or information statements, analytics

This is all easily collected at the same time, so in many ways it is almost as efficient as the proposed method.

The next part is generally also done by a professional, although the coding sheets are batched over a period of several days——this is locating all the bindery information and double-checking holdings, place of publication, and circulation code.

This could easily be done by a clerk.

The subscription information is found in Walter Library for active titles. At present the coding sheets are being batched and will be finished in this aspect at the end of the coding in the Bio-Medical Library. The receipt codes will also be filled in for the active titles later and any difficulties encountered (written on p-slips) will be remedied.

The keypunching is done by one person currently, although when the keypunch arrives and, if more help is available, there may be more than one person punching cards.

Items Which Incur Cost in the Project

Part A. (serial records converted to punched cards)

Direct equipment costs

1. Coding sheets

   These are already purchased so I suggest that the invoice price serve as the cost.

2. Key-punch rental

   The one which will be used rents for $95/month for previous use this figure can be used as a base. After November, all punching will be done on the rented machine and the work is currently being back-logged in anticipation of this.

3. Cards

   Based on approximately 10,000 entries this can be easily estimated from the test set or an analysis of sheets coded to this time to find an average number of cards/entry.

4. Miscellaneous supplies

   While most of these costs are absorbed, a gross figure could be given for pencils, paper clips, paper, etc.

5. Reference tools

   These include:
      Union Lists of Serials (and New Serial Titles)
      Index Medicus list of periodicals
      ASA Standard Periodical Abbreviations
      Index Medicus list of word abbreviations (NLM)

The last three can be written off as used expressly for the project, but the cost of the first would have to be included on the basis of use somehow, even though it is an absorbed cost.

Direct labor costs

1. Professional

   3000 hours. This assumes that approximately ½ hour per entry is spent on coding all variable fields, status, retention, etc. I propose that to check this out more closely, one of the following be done:

   a. Observe personally the coding process and the time spent on coding, splitting the coding up into three areas:

      1. easy—that which could or is being done by a clerk—under 15 minutes

      2. medium—average difficulty with usually some problems or reference needed to make abbreviation, full title, etc. 20-25 minutes

      3. difficult—that which requires a great deal of work to finish because of its unusual holdings, name changes, etc.

   After a statistically significant number of observations are made recording time, number in batch, comments, and so on, a conclusion might be drawn from the proportion of difficult, medium, and easy items and the proportion of wages paid (vs. hours) to derive a cost estimate for the job of coding. I suggest that the observations be done over a period of time such as a week instead of on separate days as often work is left to "hang over" in order to smooth out problems and/or to think a difficult item through.

   b. Observations would be very similar to the above except made on self-recording forms for each day, recording the units completed and any comments with room for each of the three categories of coding difficulty.

   c. A combination of the above to determine the reliability of the figures.

2. Clerical

   1000 hours. This includes time for key-punching and for hunting up bindery/subscription information. The following figures have been suggested:
   5 minutes/ entry of key-punching
   2 minutes/ entry for binding (active titles only)
   1 minute/ entry for subscription (all titles average
   The keypunching information can probably best be found

by self-recording forms filled out by the key-puncher as he works.

The binding and subscription time estimates can be made by taking the batch which is currently back-logged and collecting the rest of the data. By timing this batch a fair idea could be gotten of the time for doing all the work.

3. Other labor costs incurred

Checking and supervision of the clerical staff is left in one person's hands and a general estimate should be made of time spent this way.

Indirect expenses

1. Equipment

Buildings and maintenance

Although there are generally sound bases for calculating these figures when entire expenditures are known, it may prove very difficult in our case as there seems to be few if any figures available of cost/sq. foot of maintenance for buildings. If these costs can be found, they will be used; otherwise a gross estimate can be made.

2. Labor costs (fringe benefits)

These are generally easier figures to find and distribution of these costs over the work period can be calculated.

3. Other

Systems Analyst
Other personnel

These costs can be collected and figured according to percentage of time spent on the project. For instance, the systems analyst has been assigned to the Bio-Medical Library for half-time work and has been working on this project for the last three months. Including her indirect costs, the cost for her time can be figured.

Part B. Programming and Loading Files

Direct Labor Costs

1. Programmer

Although this time would be estimated only, it would run about six months to program the complete program (about two weeks to load the files) and about three to six months to debug the files. This labor cost would be estimated.

2. Personnel—operating

   The time and salary of these persons could be estimated with some help.

3. Key punch personnel

   To be estimated.

4. Library liason time and expense

   This too is to be estimated. At UCSD it took approximately 8 months of a librarian's time and 1½ months of non-professional assistance for this part. 20

Direct equipment costs

1. Computer time (including peripheral equipment)

   Although the time is being given to the project, it should be included as an absorbed cost. After consultation with the programmer the time should be estimated so an approximate cost per minute can be found through several means (approximately $8/minute)

2. Keypunch

   This will be taken care of in the rented keypunch above.

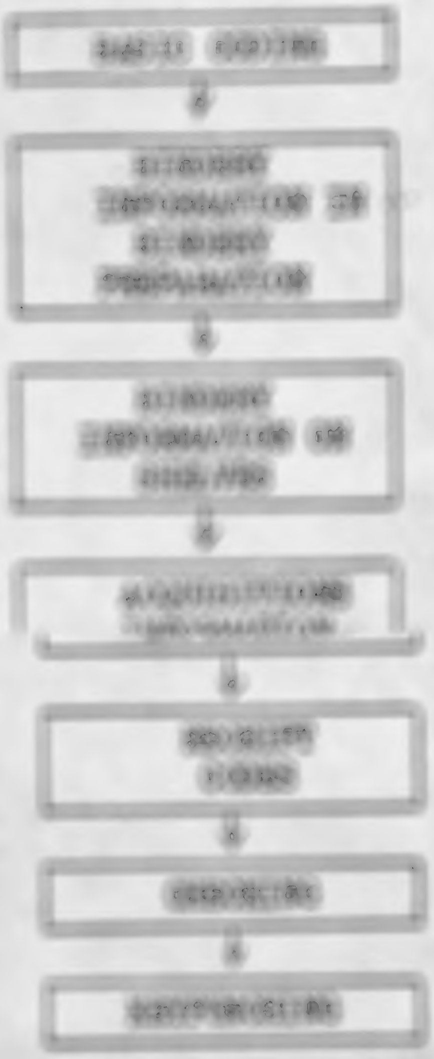
3. Cards, printout supplies, tape other supplies to be estimated.

Indirect costs

To be estimated on the same basis as above if figures are available.

After all costs are estimated as closely as possible, an approximate cost per entry will be found by totalling the costs and dividing by 10,000 (the approximate number of entries). This figure can then serve as a basis for approximating the costs of converting other serial records, although it may have to be modified somewhat to account for different situations. Absorbed costs will be listed separately from unabsorbed as well as with them in a final tally. Cost per entry will also be found for direct costs only, and for part A (converting serial records to cards) only to try to provide meaningful figures. It may also be possible under part A to provide costs for easy, difficult, and medium coding so that if these proportions are known in a library, the cost of coding in the fashion done in this project may be found approximately.

SYSTEM FLOW CHART



Basic parts of data collection

A. Coding

using serial holding cards
card catalog
Union List of Serials
Columns [illegible]
multiple titles [illegible]
and for serial titles only columns [illegible]
[illegible]

Wright, G.H. The Costs of Data Processing in University Libraries: In Serials Handling. College and Research Libraries 24(6): [illegible] November, 1963.

B. Bindery information (for active titles only)

From shelves   columns 61, 62, 63
From bindery preparation records
columns 64, 65, 66, 67, 68, 69

C. Acquisitions information (for active titles only)

columns 38, 39-40, 41-46, 47-48, 49-54, 55-58, 60

D. Receipt code (for active titles only)
columns 58-59

Variables to consider—other than time

A. Coding

Checking on active titles
difficulty of coding or extent of coding
a. unusual holdings (scattered)
b. changes of title
c. extensive notes needed
d. difficulty in presenting all ramifications of serial

B. Bindery information

title being currently bound or not (if not, then information must be gotten from where?)

C. Acquisitions information

D. Receipt code

difficulty of forming correct code

INSTRUCTIONS FOR RECORDING TIME-COST INFORMATION

A. For information pertaining to Form A

This form is to be used for recording information about how long it takes to fill in the following fields on a serial record coding sheet:

Fixed fields: 1
9-14
71-75
76
Variable fields: 1-7
and for active titles only:
Fixed fields: 17-22
26-27

For each title coded fill in the following information:

Status: A or I for active or inactive title

Time: This is to be filled in according to the number of minutes spent coding all of the above fields. The "Time Started" and "Time Finished" spaces are for use in keeping track of the time and to help make the results more accurate, so they should be used. In the "Time (in minutes)" columns, please put one digit in each column corresponding to the position of the digit in the number.

Example: 123 minutes would be filled in as:

hund.	tens	units
1	2	3

21 minutes would be:

hund.	tens	units
0	2	1

Comments: Any comments which you wish to make about a particular title or problem are welcome. We are particularly interested in comments about fixed fields not filled in (except #17-22, 26-27 for inactive titles) and about circumstances, other than interpreting the records, which unnaturally added to or subtracted from your time.

Information to the right of the double line need not be filled in. Please fill in your name and date in the upper right corner.

B. For information pertaining to Form B

This form is to be used for recording information about how long it takes to fill in the rest of the fields on the serial record coding sheets. It is arranged so that you can record time for batches of work. The following jobs may be recorded on it:

1. Gathering bindery information from shelves
   Fixed fields 61-63, verification of variable field 4, and latest date of publication.

2. Gathering bindery information from bindery preparation records in Walter Library. Fixed fields 64-69.

3. Gathering acquisition information from acquisition records in Walter Library. Fixed fields 38-58, 60.

4. Coding the receipt code
   Fixed field 26-31.

The above will generally be done only for active titles.

5. Checking completed coding sheets for errors, omissions, corrections, etc.

6. Keypunching the information on the coding sheets.

7. Other jobs.

Opposite each job, fill in the following information for each time spent worked on the job:

1. Job description: use those listed on the bottom of the recording sheet. If "Other" is used, please also write a brief description of what was done—walking to Walter to record information; getting bindery information (FF64-69) not available in bindery preparation; or other jobs done in connection with the serials automation project.

2. Number of titles processed: record the number of titles processed for each time spent working on that particular job.

3. Time in minutes: as on Form A record the number of minutes spent wording on this particular job, and the time started and finished.

4. Comments: comments are welcome to indicate how accurate the figures are. For keypunching we would particularly like an indication of the total number of cards punched.

Information to the right of the double line does not need to be filled in.

Please record your name and the date in the upper right hand corner.

These forms are for self-recording only. Try to fill in each area as accurately as possible without spending a great deal of time. While we are interested in your output, it is only because you are part of a group working on the project, not because we wish to evaluate your work against others working. If your work is interrupted, you may wish to indicate an estimated elapsed time by enclosing it in parentheses.

[illegible] ______ [illegible] ______
[illegible] ______ [illegible] ______

FORM A

STEP	ACTION	TIME STARTED	TIME FINISHED	TIME (IN MINUTES)			COMMENTS	[illegible]
				[illegible]	[illegible]	[illegible]		
1.								
2.								
3.								
4.								
5.								
6.								
7.								
8.								
9.								
10.								
11.								
12.								
13.								
14.								
15.								
16.								
17.								
18.								
19.								

Name ______________________ Hourly rate ______

FORM 3

JOB DESCRIPTION	TIME STARTED	TIME FINISHED	TIME (IN MINUTES) Total,	Breaks,	Actual	NUMBER OF TITLES PROCESSED	COMMENTS	COST/MINUTE	COST/TITLE
1.									
2.									
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									

Job descriptions: 1) obtaining information from shelves, 2) obtaining information from shelflist preparation, 3) acquisition information, 4) control coding, 5) checking, 6) keypunching, 7) other (specify)

II G. ANALYTICAL INFORMATION

A. File Record Distribution

Active titles	33%
Inactive titles	46%
Cross References	21%

Distribution of journals by subject and language see following tabulation per January 1967.

B. Creation of the Master File

B 1. Human Error Check Prior to Audit

10% contained errors discovered on code sheet which were corrected before punching.

B 2. Audit Error Statistics

7,256 records were transcribed, punched and audited before they were written on the Master tape.

1,496 or 20% were rejected by the audit program and were corrected and resubmitted for audit.

ERROR TYPES

30% Fixed field codes.
30% Holdings Statement.
20% Omitted field or field codes at end of record.
10% Card or Deck No. or Sequence errors.
10% Other (CS abbreviations, misspelled words, city of publication, other format errors).

100%

B 3. Human Check of First File Listing - Discovered Errors.

3% = Misfiling of titles
4% = Other corrections (misspelled words, wrong circulation code or location, holdings, etc.)

7% of records contained discovered errors on first file listing.

UNIVERSITY OF MINNESOTA BIO-MEDICAL LIBRARY
DISTRIBUTION OF JOURNALS BY SUBJECT
MARCH 26,1968

SUBJECT		IN BIO-MED		IN OTHER LOCATI	
		ACTIVE	INACTIVE	ACTIVE	INACTIVE
1	AEROSPACE MEDICINE	3	42	0	0
2	AGRICULTURE	1	4	0	0
3	ALLERGY	6	1	0	0
4	ANATOMY	27	41	0	0
5	ANESTHESIOLOGY	21	0	0	0
6	ANTHROPOLOGY	3	4	0	0
7	BIOCHEMISTRY	33	17	0	0
8	BIOENGINEERING	2	1	0	0
9	BIOLOGY	125	188	0	0
10	BIOPHYSICS	7	5	0	0
11	BOTANY	132	305	14	29
12	CARDIOVASCULAR SYSTEM	35	15	0	0
13	CHEMISTRY	31	14	0	0
14	CYTOLOGY AND HISTOLOGY	11	16	0	0
15	DENTISTRY	74	167	0	0
16	DERMATOLOGY AND VENEREAL DISEASES	29	31	0	0
17	DIABETES	4	4	0	0
18	DIGESTIVE SYSTEM	17	29	0	0
19	ECOLOGY	11	8	0	0
20	EDUCATION	11	23	0	0
21	ENDOCRINOLOGY	29	21	0	0
22	ENTOMOLOGY	4	16	0	0
23	ENVIRONMENTAL HEALTH	13	16	0	0
24	EPIDEMIOLOGY AND VITAL STATISTICS	8	46	0	0
25	FORENSIC MEDICINE	2	6	0	0
26	GENETICS	27	19	0	0
27	GERIATRICS	12	4	0	0
28	GYNECOLOGY AND OBSTETRICS	41	72	0	0
29	HEMATOLOGY	22	13	0	0
30	HISTORY	14	21	0	0
31	HOSPITALS	46	71	0	0
32	IMMUNOLOGY	15	6	0	0
33	INDUSTRIAL MEDICINE	13	5	0	0
34	INFECTIOUS DISEASES	14	31	0	0
35	LABORATORY ANIMALS	2	1	0	0
36	LIBRARY SCIENCE	5	3	0	0
37	MEDICAL ECONOMICS	3	1	0	0
38	MEDICINE	415	872	0	0
39	MICROBIOLOGY	48	24	0	0
40	MILITARY MEDICINE	3	13	0	0
41	NATURAL HISTORY	42	68	2	1
42	NEOPLASMS	35	47	0	0
43	NERVOUS SYSTEM	68	53	0	0
44	NURSES AND NURSING	27	52	0	0
45	NUTRITION AND METABOLISM	61	29	0	0
46	OPHTHALMOLOGY	28	62	0	0
47	ORNITHOLOGY	3	22	7	17
48	ORTHOPEDICS	13	18	0	0
49	OTORHINOLARYNGOLOGY	27	21	0	0
50	PATHOLOGY	38	34	0	0

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	IN BIO-MED		IN OTHER LOCATIONS		TOTAL
	ACTIVE	INACTIVE	ACTIVE	INACTIVE	CM.P
	3	42	0	0	17770
	1	6	0	0	3320
	6	1	0	0	3536
	27	41	0	0	30436
	21	0	0	0	6332
	3	8	0	0	2860
	33	17	0	0	15944
	2	1	0	0	816
	125	188	0	0	112540
	7	5	0	0	3540
	132	315	10	29	103948
	25	15	0	0	16096
	30	17	0	0	17748
	11	18	0	0	8056
	74	167	0	0	62348
L DISEAS	29	31	0	0	20008
	4	4	0	0	2408
	17	19	0	0	11616
	11	8	0	0	4672
	11	23	0	0	12060
	25	21	0	0	13996
	8	16	0	0	6128
	13	16	0	0	11208
[illegible]	6	46	0	0	19928
	2	0	0	0	3132
	27	10	0	0	14660
	12	4	0	0	4300
S	41	72	0	0	40076
	22	13	0	0	12148
	18	20	0	0	12464
	66	71	0	0	45512
	15	6	0	0	7484
	10	9	0	0	6136
	10	30	0	0	14236
	2	1	0	0	1220
	6	3	0	0	2092
	3	1	0	0	1444
	413	872	0	0	443048
	46	29	0	0	27508
	3	13	0	0	6896
	41	66	2	1	45518
	35	47	0	0	29228
	44	53	0	0	30196
	27	52	0	0	25512
[illegible]	21	26	0	0	16036
	28	42	0	0	33048
	8	22	7	17	17242
	13	18	0	0	8632
	27	21	0	0	10724
	38	35	0	0	26040

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[illegible]

	SUBJECT	IN BIO-MED ACTIVE	IN BIO-MED INACTIVE	IN OTHER LOCATI ACTIVE	IN OTHER LOCATI INACTIVE
51	PEDIATRICS	55	63	0	0
52	PHARMACY AND PHARMACOLOGY	36	98	0	0
53	PHYSICAL MEDICINE AND REHABILITATION	14	25	0	0
54	PHYSIOLOGY	13	56	0	0
55	PSYCHIATRY	58	64	0	0
56	PSYCHOLOGY	49	23	0	0
57	PUBLIC HEALTH	66	135	0	0
58	RADIOLOGY AND NUCLEAR MEDICINE	53	27	0	0
59	RESPIRATORY SYSTEM	26	38	0	0
60	[illegible]	7	8	0	0
61	SCIENCE	56	49	0	1
62	SCIENTIFIC APPARATUS AND INSTRUMENTS	14	23	0	2
63	STATISTICS	3	3	0	0
64	SURGERY	42	84	0	0
65	TROPICAL MEDICINE	18	32	0	0
66	UROGENITAL SYSTEM	18	27	0	0
67	VETERINARY MEDICINE	3	11	0	0
68	ZOOLOGY	63	130	1	0
69	[illegible]	6	18	1	0
70		25	0	0	0
71		0	0	0	0
72		0	0	0	0
73		0	0	0	0
74		0	0	0	0
75		0	0	0	0
76		0	0	0	0
77		0	0	0	0
78		0	0	0	0
79		0	0	0	0
80		0	0	0	0
81		0	0	0	0
82		0	0	0	0
83		0	0	0	0
84		0	0	0	0
85		0	0	0	0
86		0	0	0	0
87		0	0	0	0
88		0	0	0	0
89		0	0	0	0
90		0	0	0	0
91		0	0	0	0
92		0	0	0	0
93		0	0	0	0
94		0	0	0	0
95		0	0	0	0
96		0	0	0	0
97		0	0	0	0
98		0	0	0	0
99		0	0	0	0
TOT		[illegible]	[illegible]	[illegible]	[illegible]

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[illegible]

IN [illegible] IN OTHER LOCATIONS TOTAL
ACTIVE INACTIVE ACTIVE INACTIVE [illegible]

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[illegible]

LANGUAGE	IN BIOMED ACTUAL	IN BIOMED EFFECTIVE	IN OTHER LIBRARIES ACTUAL	IN OTHER LIBRARIES EFFECTIVE
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]